

# Notice of Allowability

Application No.

10/764,802

Examiner

Stephen J. Cherry

Applicant(s)

HERBSTREIT ET AL.

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 6-19-2006.
2. ☒ The allowed claim(s) is/are 1,3-13,15-21 and 23-28.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

### EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Barr on 6-22-2006.

The application has been amended as follows:

Please delete the claims and replace with the following claims:

1. A method of simulating a volume of liquid within a tank during motion, comprising:

receiving tank geometry information;

receiving sensor configuration information;

receiving tank motion information;

computing one or more fuel-plane-to-sensor intersections for at least one tank position based on the tank motion information;

computing one or more wetted volumes, each wetted volume being computed at a fuel-plane-to-sensor intersection for each sensor location based on the sensor configuration information;

computing a fuel quantity at every fuel-plane-to-sensor intersection based on a sum of the one or more wetted volumes;

computing an error for each computation of fuel quantity;

comparing the error with at least one previously computed error; and  
at least one of storing, transmitting, and displaying one or more of the computed fuel quantities and the computed errors.

2. (Canceled)

3. The method of Claim 1, further comprising adjusting a gain of at least one of the sensors based on the comparison between the error and the previously computed error, and repeating the computing of the wetted volumes, the computing of the fuel quantities, the computing of the error, and the comparing of the error.

4. The method of Claim 1 wherein receiving tank geometry information includes receiving height-to-volume values.

5. The method of Claim 1 wherein receiving tank geometry information includes receiving an input file of height-to-volume values from a storage device, the height-to-volume values being obtained by incrementally slicing through a computer aided design model of the tank at a given attitude, each slice being an incremental volume of the tank.

6. The method of Claim 1, wherein computing one or more fuel-plane-to-sensor intersections includes interpolating the height-to-volume information from the tank geometry information to a desired attitude.

7. The method of Claim 1, wherein computing one or more fuel-plane-to-sensor intersections includes mathematically transforming sensor coordinates from the sensor configuration information.

8. The method of Claim 1, wherein computing one or more errors includes computing one or more errors for each computation of wetted volume, the method further comprising determining a non-linearity condition of a fuel gauging system based on one or more of the computed errors.

9. The method of Claim 8, further comprising optimizing the error for a single motion condition if the fuel gauging system is non-linear.

10. The method of Claim 9, wherein the single motion condition includes a single attitude.

11. The method of Claim 8, further comprising optimizing the error for a plurality of motion conditions if the fuel gauging system is non-linear.

12. The method of Claim 11, wherein the plurality of motion conditions includes a plurality of attitudes.

13. A computer-readable medium encoded with a computer program product for simulating a volume of liquid within a tank during motion, comprising:

a first computer program portion adapted to receive tank geometry information;

a second computer program portion adapted receive sensor configuration information;

a third computer program portion adapted to receive tank motion information;

a fourth computer program portion adapted to compute one or more fuel-plane-to-sensor intersections for at least one tank position based on the tank motion information;

a fifth computer program portion adapted to compute one or more wetted volumes, each wetted volume being computed at a fuel-plane-to-sensor intersection for each sensor location based on the sensor configuration information;

a sixth computer program portion adapted to compute a fuel quantity at every fuel-plane-to-sensor intersection based on a sum of the one or more wetted volumes; and

a seventh computer program portion adapted to compute an error for each computation of fuel quantity, and to compare the error with at least one previously computed error, and to at least one of store, transmit, and display one or more of the computed fuel quantities and the computed errors.

14. (Canceled)

15. The computer-readable medium of Claim 13, further comprising an eighth computer program portion adapted to adjust a gain of at least one of the sensors based on the comparison between the error and the previously computed error.

16. The computer-readable medium of Claim 13, wherein the first computer program portion is adapted to receive height-to-volume values.

17. The computer-readable medium of Claim 13, wherein the fourth computer program portion is adapted to interpolate height-to-volume information from the tank geometry information to a desired attitude.

18. The computer-readable medium of Claim 13, wherein the seventh computer program portion is further adapted to determine a non-linearity condition of a fuel gauging system based on one or more of the computed errors.

19. The computer-readable medium of Claim 18, further comprising an eighth computer program portion adapted to optimize the error for at least one motion condition if the fuel gauging system is non-linear.

20. The computer-readable medium of Claim 19, wherein the at least one motion condition includes an attitude.

21. A system for simulating a volume of liquid within a tank during motion, comprising:

- a control component;

- an input/output device coupled to receive input data; and

- a processor arranged to analyze the input data, the processor including:

- a first portion adapted to receive tank geometry information;

- a program portion adapted to receive sensor configuration information;

- a third portion adapted to receive tank motion information;

a fourth portion adapted to compute one or more fuel-plane-to-sensor intersections for at least one tank position based on the tank motion information;

a fifth portion adapted to compute one or more wetted volumes, each wetted volume being computed at a fuel-plane-to-sensor intersection for each sensor location based on the sensor configuration information;

a sixth portion adapted to compute a fuel quantity at every fuel-plane-to-sensor intersection based on a sum of the one or more wetted volumes; and

a seventh portion adapted to compute an error for each computation of fuel quantity, and to compare the error with at least one previously computed error and to at least one of store, transmit, and display one or more of the computed fuel quantities and the computed errors.

22. (Canceled)

23. The system of Claim 21, wherein the processor further includes a seventh portion adapted to adjust a gain of at least one of the sensors based on the comparison between the error and the previously computed error.

24. The system of Claim 21, wherein the first portion is adapted to receive height-to-volume values.

25. The system of Claim 21, wherein the fourth portion is adapted to interpolate height-to-volume information from the tank geometry information to a desired attitude.

26. The system of Claim 21, wherein the seventh portion is further adapted to determine a non-linearity condition of a fuel gauging system based on one or more of the computed errors.

27. The system of Claim 26, wherein the processor further includes an eighth portion adapted to optimize the error for at least one motion condition if the fuel gauging system is non-linear.

28. The system of Claim 27, wherein the at least one motion condition includes an attitude.

Claims 1,3-13,15-21 and 23-28 are allowed.

The following is an examiner's statement of reasons for allowance:

The reason for allowance is as indicated in the Office Action dated 4-17-2006 because the subject matter of dependent claims indicated as allowable has been incorporated into the independent claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably



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accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Cherry whose telephone number is (571) 272-2272. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SJC

  
MICHAEL NGHIEM  
PRIMARY EXAMINER